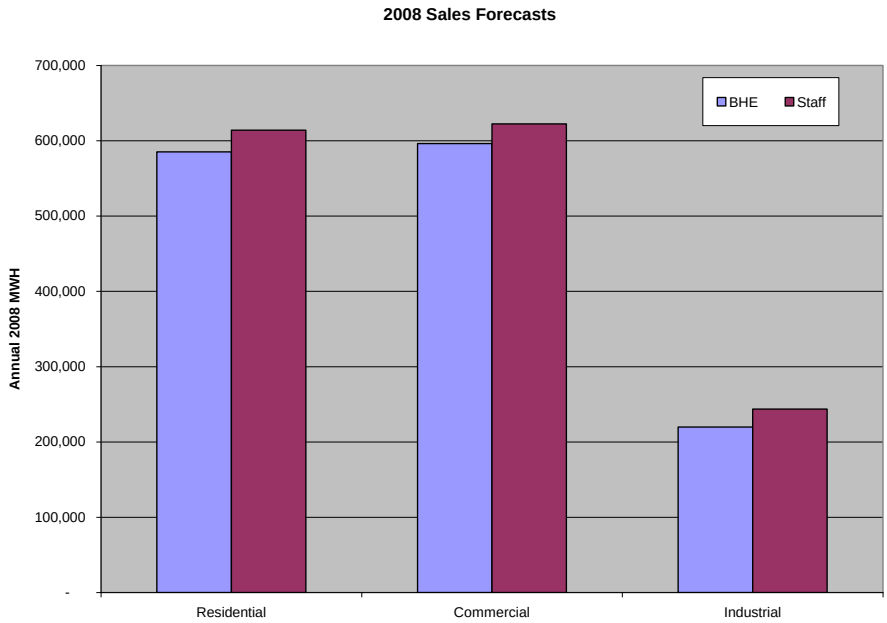
Sales Forecast

1. Introduction

In this part of the Bench Analysis we address the sales forecast that BHE developed as a basis for its requested rate increase and present an alternative forecast that we consider to be a more plausible estimate of sales in the rate year. BHE projects residential sales to decline by 2.26% from 2005 to 2008 while commercial sales are projected to decrease by 1.75% and industrial sales are forecast to decline by 10.08%. Because rates are ultimately computed as the product of revenue requirement and sales, the decline in energy sales projected by BHE increases the company's required rates.

In contrast, we estimate that residential and commercial sales will increase by 2.6% from 2005 to 2008 (an average of .85% per year) and industrial sales will decrease by 1.7%. A comparison of the BHE and Staff forecast is presented in the graph and table below.

	2005 Actual (MWH)	2008 BHE Proposal (MWH)	Percent BHE Proposal vs 2005 Actual	BHE Proposed 2008 Revenue per kWH	Our 2008 Forecast (MWH)	Percentage Growth 2005-2008	Compound Annual Growth Rate 2005-2008	Difference - Staff versus BHE (MWH)	Percent Staff versus BHE Sales
Residential	598,648	585,098	-2.26%	0.0553	614,055	2.57%	0.85%	28,958	4.9%
Commercial	606,859	596,261	-1.75%	0.0343	622,410	2.56%	0.85%	26,148	4.4%
Industrial	244,255	219,642	-10.08%	0.0184	243,642	-0.25%	-0.08%	24,000	10.9%
Lighting	8,660	8,675	0.17%	0.1759	8,794	1.54%	0.51%	119	1.4%
Total	1,458,422	1,409,676	-3.34%		1,488,901	2.09%	0.69%	79,224	5.6%



The average revenue per kWh is shown on the table above to highlight the relative importance of the sales to various customer classes. For example, even though the industrial sales are expected to decline by more than other categories, the effect on BHE distribution rates from this assumption is less than the effect of residential and commercial sales declines because industrial customers pay relatively low distribution rates.[1]

The alternative sales forecast shown above comes from our review of BHE's DSM savings calculations, from our analysis of the Company's residential and commercial regression equations, and from our evaluation of BHE's approach to estimating industrial sales on a customer by customer basis. To

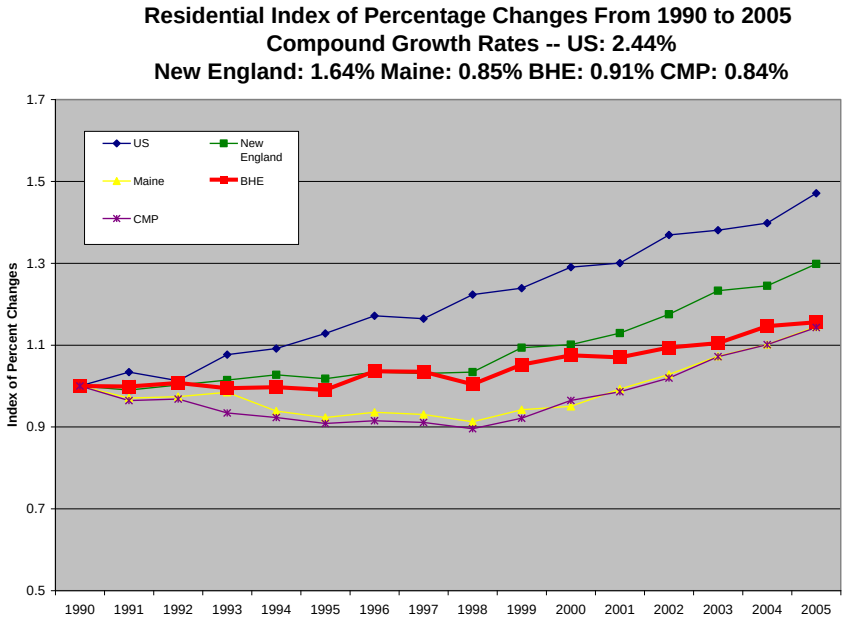
[1] The average rates in the above table do not reflect rate structure changes that were recently made by BHE. The most significant change in terms of project revenues is the creation of a new T1 class for customers that take service at the transmission and sub-transmission voltages in industrial class with rates effective July 2007 that are substantially lower than current levels. The implication of this rate change from a sales forecasting perspective is that the residential and commercial forecast is more important.

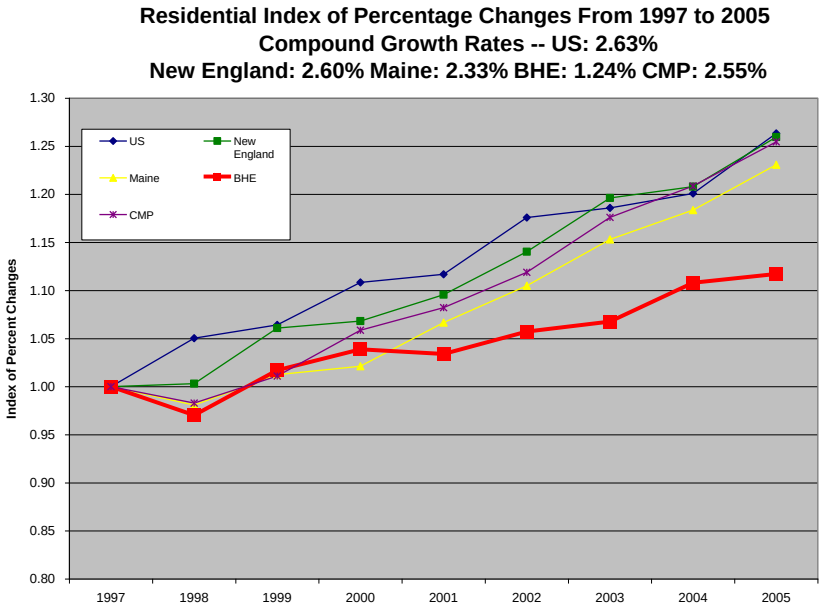
explain how we have derived the alternative sales forecast, we begin with a review of how BHE's historic sales compare with the sales realized by companies in other places. Then, we compare BHE's sales projections with electricity sales projections made by the U.S. Energy Information Agency ("EIA") for the New England region. Before discussing specific adjustments to the forecast, we dissect BHE's residential and commercial sales forecast into various component parts. In the remaining sections we then describe the details of how we compute the alternative forecast. We first discuss how the DSM calculations made by BHE. Next, we describe how prospective changes in the price of electricity affect the sales forecast. Following the analysis of future prices, we present the residential and commercial regression analysis and the resulting forecasts. Finally, we present our conclusions with respect to industrial and lighting forecasts. There are three appendices to this section of the Bench Analysis. The first appendix discusses inflation indices used in the analysis; the second appendix addresses transformation to logarithms; and the third describes use of trend variables.

2. Comparison of BHE's Historic Sales to Other Regions

This section reviews the history of BHE's residential, commercial and industrial sales in order to provide a context for the analysis of BHE's forecast. Data for the U.S. and New England come from the Energy Information Agency ("EIA") while information for BHE and CMP come from sales data reported in the FERC Form 1. In reviewing historic sales we separately present data for the residential, commercial and industrial segments.

The two graphs below compare an index of BHE residential sales with residential sales realized by all utilities in the U.S., by utilities in New England, and by CMP. The two graphs have different starting points to illustrate short-term and long-term trends – the first graph starts in 1990 and the second graph begins in 1997.

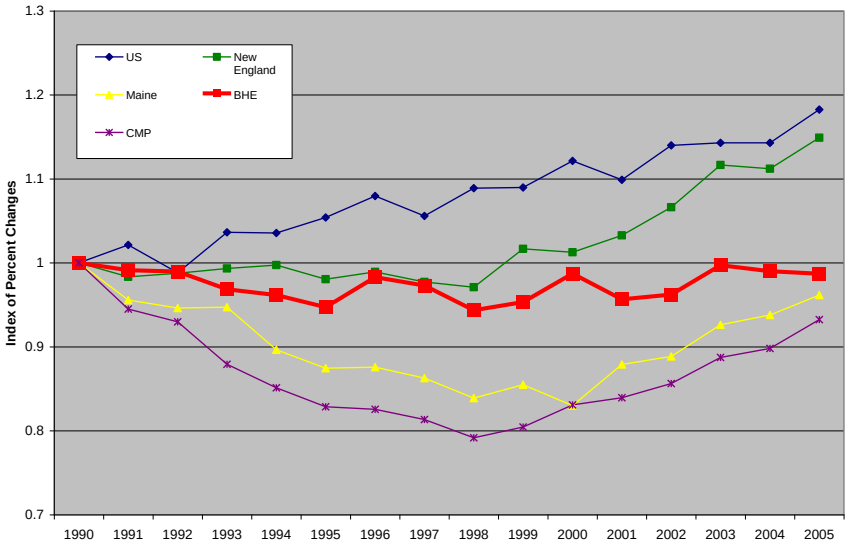




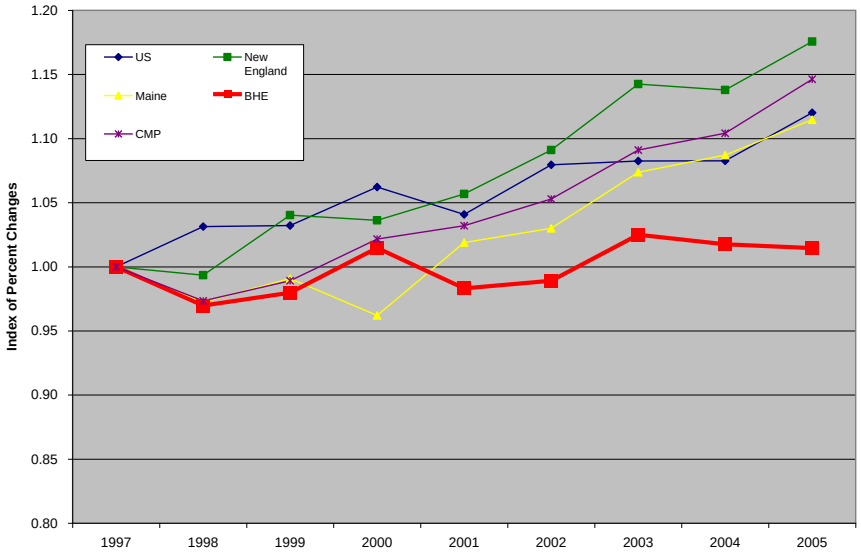
The graphs of residential sales demonstrate that BHE has realized somewhat lower growth than the U.S. average, New England or CMP over the past few years. However, since 1997 BHE has realized a compound annual growth rate of more than 1.2% (shown on second line of the graph title) and the Company has not experienced four straight years of sales declines as projected by BHE in this case. In comparison to historic trends, then, our forecast is more consistent than BHE's, projection a compound growth rate of 0.85% from 2005 to 2008 which is below both the long or short term growth rates shown on the above graphs.

The second set of charts shows trends in residential usage per customer for BHE and the comparative group. The charts demonstrate that the growth in BHE use per customer has been less than the U.S. average, New England or CMP. The chart implies that most of BHE's sales growth has come from customer growth rather than usage growth.

Residential Use Per Customer Index of Percentage Changes From 1990 to 2005
Compound Growth Rates -- US: 1.05%
New England: 0.87% Maine: -0.24% BHE: -0.08% CMP: -0.44%

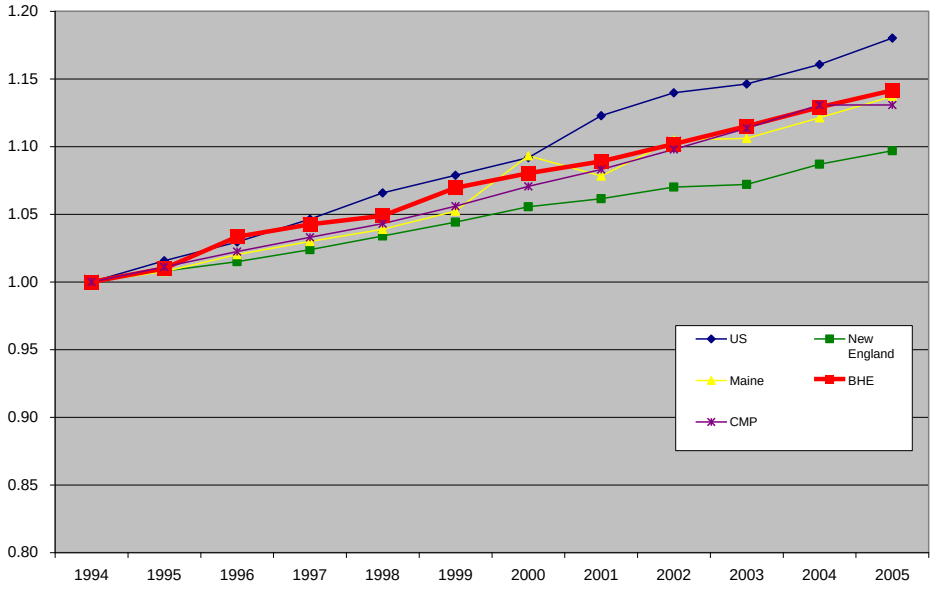


Residential Use Per Customer Index of Percentage Changes From 1997 to 2005
Compound Growth Rates -- US: 1.27%
New England: 1.81% Maine: 1.21% BHE: 0.16% CMP: 1.53%

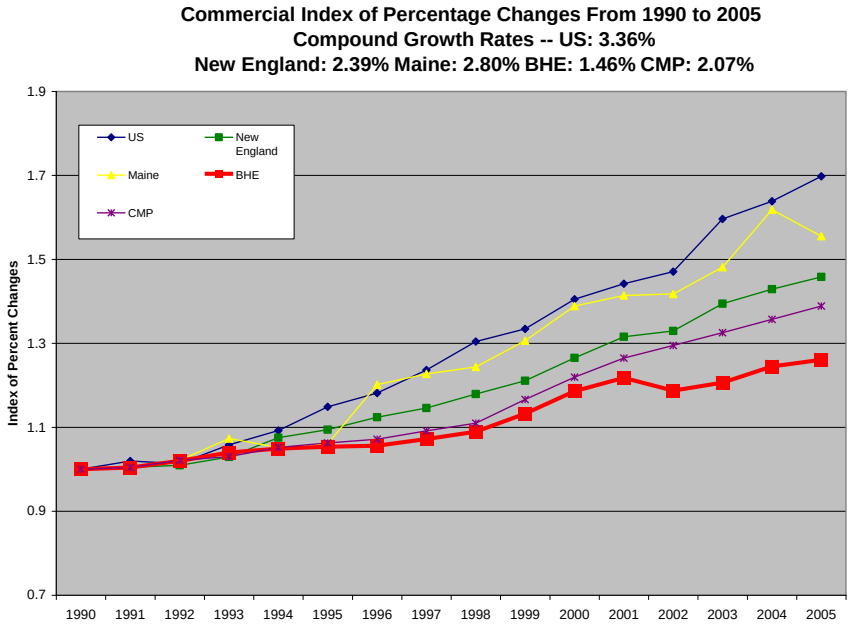


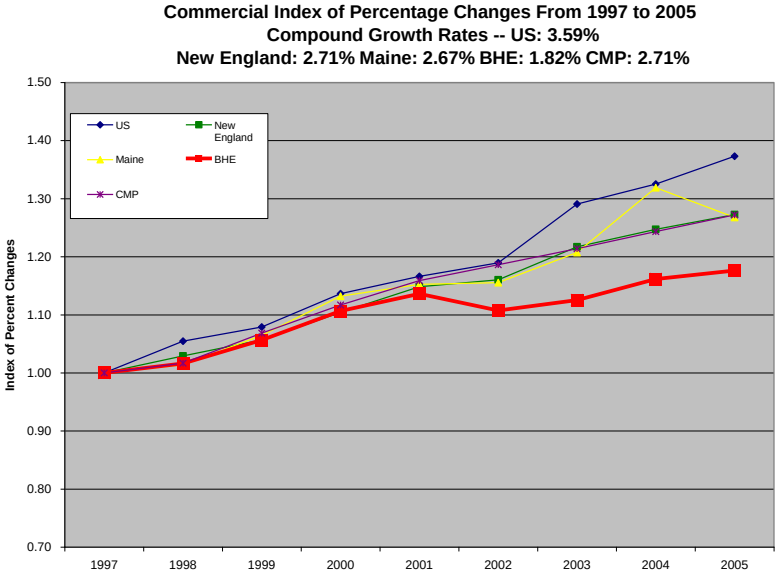
Trends in the number of customers are show in the next graph. This graph illustrates that BHE has experienced higher growth than New England but somewhat lower growth than the U.S. in aggregate.

Residential Customers Index From 1994 to 2005
US: 1.39% New England: 0.77% Maine: 1.08% BHE: 1.11% CMP: 1.03%

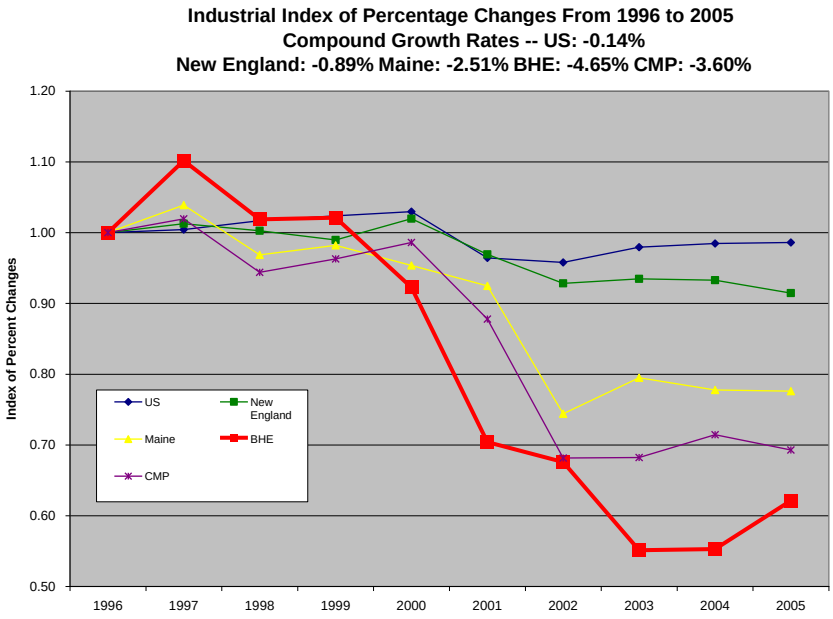


Commercial sales for BHE and the comparative group are presented in the subsequent two graphs. The graphs show that commercial growth has been greater than residential growth and that BHE's sales growth has been less than other areas of the country. Our forecast of commercial sales results in a compound annual growth rate of 0.85% which is less than the growth rate realized by the Company in the long-term or the short-term.





Industrial sales are shown on the final graph in this section. The graph shows that both CMP and BHE have experienced sales declines from 1999 to 2003. However, after bottoming-out in 2003, the industrial sales have risen slightly. Our forecast of industrial sales results in a forecast which is essentially flat.



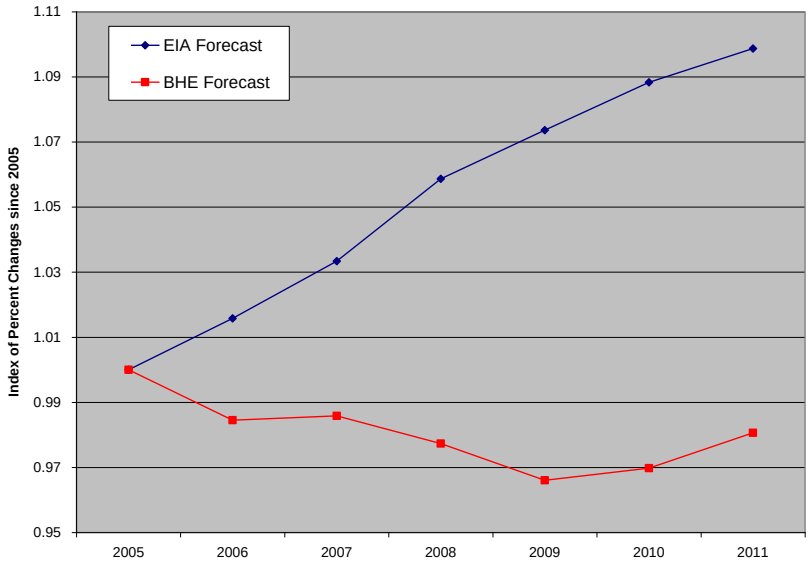
3. BHE's Sales Forecast Compared to EIA's New England Sales Forecast

In this section we compare BHE's sales forecast to the forecast of New England sales prepared by the EIA. The EIA forecast incorporates the effects of energy efficiency gains (analogous to BHE's DSM savings), accounts for price elasticity adjustments and reflects forecasts of overall economic growth. Reference materials for the EIA forecast demonstrate that it is comprehensive and sophisticated.[2]

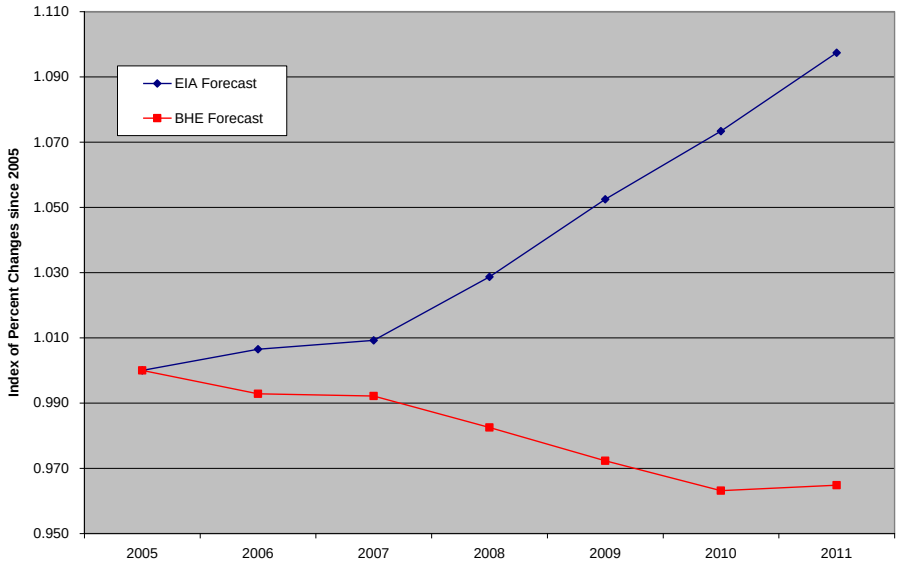
[2] We have reviewed documentation of the EIA residential forecast published in its report titled: "Assumptions to the Annual Energy Outlook." This report shows that EIA forecast includes analysis of residential end-uses, effects of changes in the price of electricity and incorporation of macroeconomic forecasts developed by Global Insight. The documentation demonstrates that the EIA approach incorporates end-use, macroeconomic and price elasticity variables and that it reflects up to date information involving energy prices.

The graphs below compare the BHE forecast with the EIA forecast for residential, commercial and industrial sales. To make the comparison, we express both the EIA and the BHE forecast in terms of an index starting in 2005 with a value of 1.0. (The industrial graph for BHE is defined as sales in the D4 rate class.) While, historically, BHE has not precisely matched overall New England growth rates, the growth trend has generally been in the same direction. In contrast, as shown below, BHE is forecasting a divergence with respect to direction between its residential and commercial sales growth and growth New England-wide.

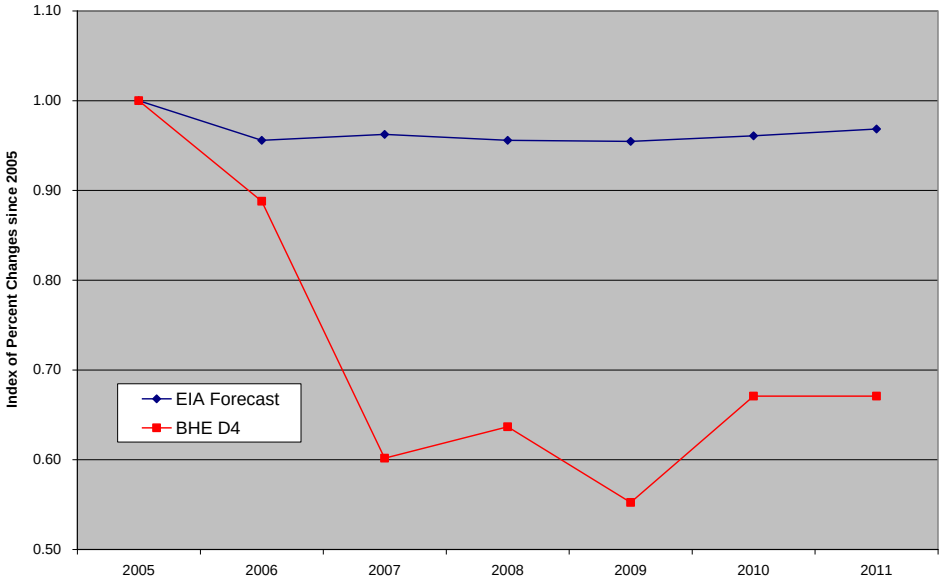
BHE Residential Forecast vs EIA New England Forecast



BHE Commercial Forecast vs EIA New England Forecast



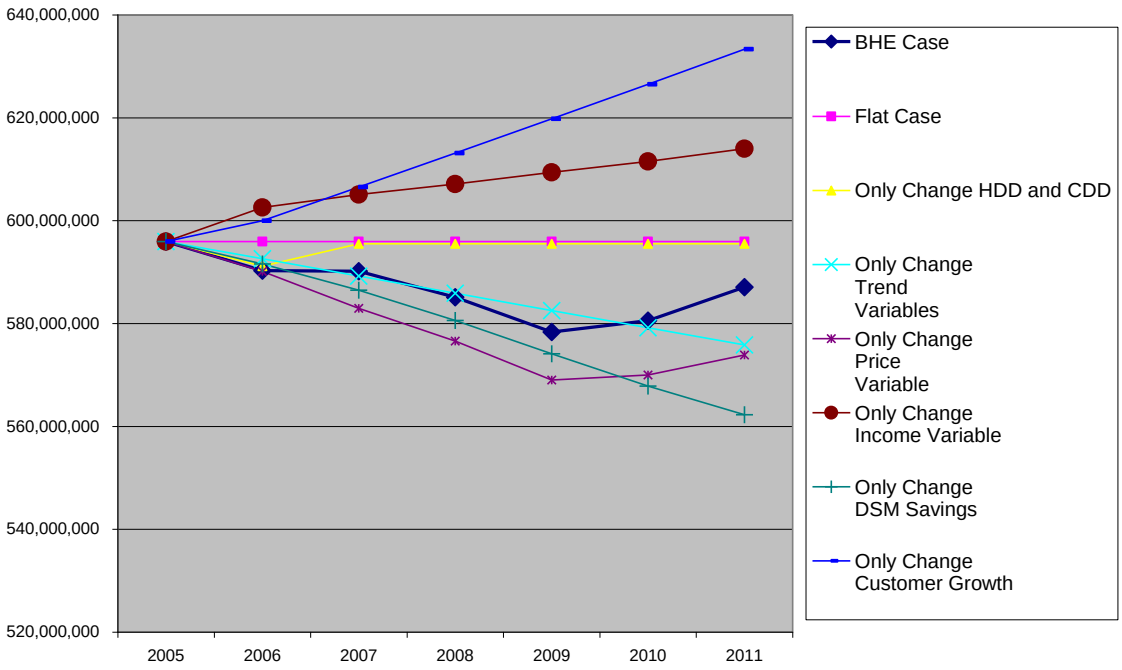
BHE Industrial Forecast vs EIA New England Forecast



4. Components of BHE's Sales Forecast

To isolate the effect of the various factors driving BHE's sales forecast, we have disaggregated BHE's forecast into different component parts. The graph shows the results of this analysis for residential sales.

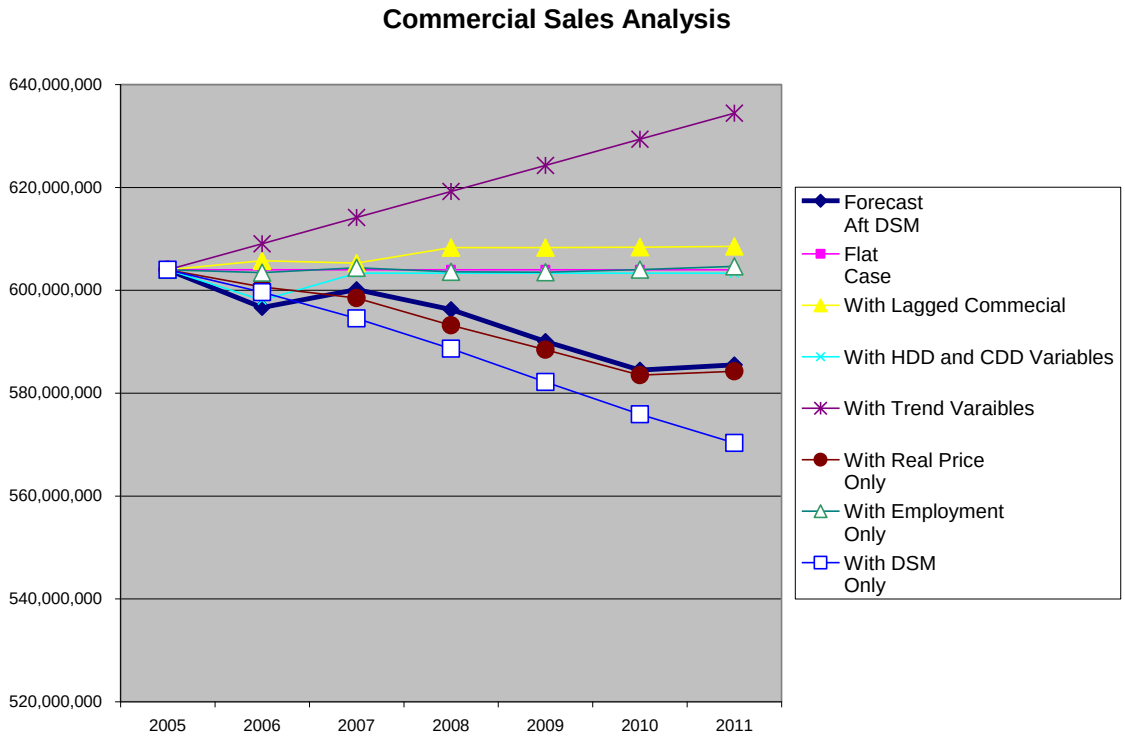
Residential Forecast Components



This analysis demonstrates that variables which cause sales to decline are the trend variables, price elasticity and the assumed DSM savings. Factors that cause the residential sales projection to increase are the customer growth and the projected increases in household income. The heating degree days and the cooling degree days do not have much of an effect on the forecast. The trend variables in the graph show the effect on the BHE forecast of including a variable that counts each quarter in its regression analysis. Time trend variables are further discussed in Appendix C. In reviewing BHE's sales forecast below, we have investigated each of the various components and we begin with the two

factors that cause the sales to decline by the widest margin – DSM and price elasticity.

We have prepared a similar analysis of the components that drive BHE's commercial sales forecast using 2005 as a base. The graph and table below show the results of this analysis. The graph demonstrates that the primary factors driving sales down are the DSM savings and the effects of price elasticity. The single factor that causes the commercial forecast to increase is the trend variable.



5. DSM Adjustments to BHE Sales Forecast

The first component of BHE's forecast that we analyze is the manner in which projected savings from DSM programs affect the forecast. BHE developed its analysis of DSM savings from Efficiency Maine budgets.[3] BHE assumes that each nominal millions dollar spent by Efficiency Maine will result in 5,000 MWH of savings and then allocates total savings realized for the State of Maine to the BHE service territory on the basis of relative sales. In investigating whether BHE's estimates are reasonable, we have worked through BHE's analysis, we have compared the BHE estimates to those made by CMP and we have discussed the DSM energy savings with Efficiency Maine officials. BHE's overall approach to estimating DSM savings comes directly from the director of Efficiency Maine and we find the general approach to forecasting future aggregate DSM savings reasonable. However, there are a number of issues that arise from details in the way BHE computes the savings. Some of these issues include:

1. BHE's use of nominal Efficiency Maine expenditures rather than real expenditures to estimate future DSM savings.
2. BHE's assumption that the Company represents 16% of sales in the State of Maine.

[3] The BHE projections do not include recent activities in the state legislature related to RGGI and Efficiency Maine assessment. We assume these will have little or no effect on DSM until after the rate year limits which could increase DSM after the 2008 rate year. The analysis also does not account for the fact that certain industrial customers will no longer pay DSM charges and also will not receive benefits which could have the effect of lower amounts of DSM.

3. BHE's assumption that allocation of DSM savings are achieved only by residential and commercial classes and no savings accrue to industrial customers.

4. BHE's methodology for allocating annual projected DSM savings to individual quarters within a year.

5. BHE's assumption that there are no savings embedded in current and historic sales from earlier programs that were administered by BHE.

Use of Real Dollars Rather than Nominal Dollars

To reflect the effect of inflation, the Efficiency Maine expenditure projection should be converted to real dollars before multiplying the dollar amounts by 5,000 MWH.[4] The correction for inflation lowers aggregate DSM savings by 4.5% in 2008 as shown on the table below.[5]

[4] In adjusting items for inflation, we have used a projected inflation rate that differs from the rate used by BHE in its filed testimony which contained errors. The rationale for the inflation adjustments is discussed in Appendix A.

[5] The adjustment includes a half year convention for applying inflation factors since the expenditures occur continually throughout the year.

	Efficiency Maine Expenditures ($M) in Calender Year	Corrected Infalation Index	Index with 2006 as Base	MWH per Dollar Spent - Real 2006	Calender Year Spending in Real Terms adjusted for 1/2 Year Inflation	Corrected Aggregate Savings (MWH)	BHE Assumption (MWH)	Percent Difference
1989		0.81	0.72					
1990		0.84	0.74					
1991		0.87	0.77					
1992		0.89	0.78					
1993		0.90	0.80					
1994		0.92	0.81					
1995		0.94	0.83					
1996		0.95	0.84					
1997		0.97	0.85					
1998		0.97	0.86					
1999		0.98	0.87					
2000		1.00	0.88					
2001		1.02	0.90					
2002	$ 0.6	1.03	0.91		0.61	2,914	2,914	0.0%
2003	$ 2.5	1.05	0.92		2.73	11,839	11,839	0.0%
2004	$ 5.5	1.08	0.95		5.87	23,937	23,937	0.0%
2005	$ 8.2	1.11	0.98		8.45	38,012	38,012	0.0%
2006	$ 10.7	1.13	1.00		10.81	53,475	53,475	0.0%
2007	$ 12.5	1.16	1.02	5,000	12.39	61,944	62,688	-1.2%
2008	$ 14.5	1.19	1.05	5,000	13.98	69,880	72,380	-3.5%
2009	$ 16.5	1.21	1.07	5,000	15.61	78,037	82,648	-5.6%
2010	$ 17.7	1.24	1.09	5,000	16.40	81,982	88,735	-7.6%
2011	$ 18.5	1.27	1.12	5,000	16.73	83,630	92,510	-9.6%

BHE Sales as Percent of Sales in Maine

The second adjustment we have made to BHE's calculation of DSM savings involves percent of electricity sales in the State of Maine represented by BHE which BHE assumed to be 16.28%. The table below shows percent of residential, commercial and industrial sales for BHE. The BHE and CMP data are taken from the FERC Form 1 reports for 2005 and the statewide sales are from the EIA website, also for 2005. The table shows that BHE represents less than 16% of total statewide sales. In correcting the BHE analysis, we have allocated DSM using the state-wide percentages for each customer class. The implication of the alternative percentage of statewide sales on DSM savings is shown in the subsequent section.

BHE Energy Sales Relative to Other Companies in Maine (MWH)				
	Residential	Commercial	Industrial	Total
BHE	**598,649**	**606,859**	**404,221**	**1,609,729**
CMP	3,529,120	3,217,267	2,564,001	9,310,388
MPS	180,107	199,487	170,905	550,499
MEW	16,967	4,346	219,288	240,601
HWC	27,819	10,871	64,491	103,181
Swans Is.	2,360			2,360
KLP	48,723	25,818	33,912	108,453
Van Buren	7,350	2,334	3,500	13,184
Fox Island	6,728	2,875	98	9,701
EMEC	52,643	19,935	15,292	87,870
Total	4,470,466	4,089,792	3,475,708	12,035,966
BHE Percent of Total	**13.40%**	**14.80%**	**11.60%**	**13.40%**

Allocation of DSM Savings to Customer Classes

BHE allocates all of the Efficiency Maine savings to the residential and commercial class and none to the industrial class. The company assumes that the residential class realizes 50% of the DSM savings and that the commercial class realizes the other half. BHE made this assumption through review of Efficiency Maine reports which state that about half of the savings are from residential customers and half come from business customers. The table below shows the DSM savings that result from assuming that 50% of savings accrue to residential customers and that BHE sales represent 13.4% of statewide sales. The table shows that the alternative assumption, with respect to BHE sales as a proportion of sales in Maine, reduces DSM savings by about 19% in the 2008 rate year.

	Efficiency Maine Expenditures ($M) in Calender Year	Calender Year Spending in Real Terms adjusted for 1/2 Year Inflation	Corrected Aggregate Savings (MWH)	BHE Residential as Percent of State	BHE Residential Percent	Residential Incremental DSM Savings	Opening Cumulative Savings	Add: Incremental Savings	Less: Expired Savings	Closing Cumulative Savings	BHE Assumption	Percent Difference
1989				13.39%	50%	-	-	-		-	-	
1990				13.39%	50%	-	-	-		-	-	
1991				13.39%	50%	-	-	-		-	-	
1992				13.39%	50%	-	-	-		-	-	
1993				13.39%	50%	-	-	-		-	-	
1994				13.39%	50%	-	-	-		-	-	
1995				13.39%	50%	-	-	-		-	-	
1996				13.39%	50%	-	-	-		-	-	
1997				13.39%	50%	-	-	-		-	-	
1998				13.39%	50%	-	-	-		-	-	
1999				13.39%	50%	-	-	-		-	-	
2000				13.39%	50%	-	-	-		-	-	
2001				13.39%	50%	-	-	-		-	-	
2002	$ 0.6	0.61	2,914	13.39%	50%	195	-	195		195.08	237.14	-17.7%
2003	$ 2.5	2.73	11,839	13.39%	50%	793	195.08	793		987.77	1,200.77	-17.7%
2004	$ 5.5	5.87	23,937	13.39%	50%	1,603	987.77	1,603		2,590.49	3,149.11	-17.7%
2005	$ 8.2	8.45	38,012	13.39%	50%	2,545	2,590.49	2,545		5,135.59	6,243.04	-17.7%
2006	$ 10.7	10.81	53,475	13.39%	50%	3,580	5,135.59	3,580		8,716.06	10,595.62	-17.7%
2007	$ 12.5	12.39	61,944	13.39%	50%	4,148	8,716.06	4,148		12,863.60	15,698.04	-18.1%
2008	$ 14.5	13.98	69,880	13.39%	50%	4,679	12,863.60	4,679		17,542.48	21,589.38	-18.7%
2009	$ 16.5	15.61	78,037	13.39%	50%	5,225	17,542.48	5,225	195	22,572.48	28,079.29	-19.6%
2010	$ 17.7	16.40	81,982	13.39%	50%	5,489	22,572.48	5,489	1,603	26,458.92	34,338.21	-22.9%
2011	$ 18.5	16.73	83,630	13.39%	50%	5,600	26,458.92	5,600	2,545	29,513.33	39,919.68	-26.1%

BHE's assumption that all business DSM accrues to commercial customers and none to industrial customers is a negative assumption from the perspective of ratepayers and is positive for BHE. Had BHE allocated DSM savings to the industrial as well as the commercial class, the ultimate level of distribution rates would be lower because less revenue would be lost due to lower industrial rates. Some of the DSM savings generated from Efficiency Maine programs do accrue to customers that take service under BHE's industrial rate D4. Documents provided by Efficiency Maine and summarized on the table below show that industrial customers comprise more than 30% of the total Efficiency Maine business expenditures and energy savings in the BHE territory. The statistics shown in the table exclude paper companies from the analysis.

		Incentive	Annual kWh Saved
Total Without Paper	$	501,999.83	3,223,726
Add: Less than 50 Employees	$	34,667.00	310,971
Total	$	536,666.83	3,534,697
Industrial	$	161,326.48	1,139,241
Industrial Percent		30.1%	32.2%
Commercial Percent		69.9%	67.8%

The tables below show annual DSM savings for businesses using the more appropriate allocation between commercial and industrial customers. The first table shows that the more appropriate allocations reduce commercial DSM savings in the 2008 rate year by 37%. The allocation of DSM savings to industrial customers is shown in the second table. The incremental savings realized by industrial customers are included in the industrial forecast described below.

	Corrected Aggregate Savings (MWH)	BHE Assumption (MWH)	Percent Difference	Allocation to Commercial	Commercial DSM Savings in State	BHE as Percent of State Commercial	BHE Commercial Savings per year (MWH)	Opening Cumulative Savings (MWH)	Add: Incremental Savings (MWH)	Less: Expired Savings (MWH)	Closing Cumulative Savings (MWH)	BHE Assumption	Percent Difference
1989				35%	-	14.80%	-						
1990				35%	-	14.80%	-	-	-		-		
1991				35%	-	14.80%	-	-	-		-		
1992				35%	-	14.80%	-	-	-		-		
1993				35%	-	14.80%	-	-	-		-		
1994				35%	-	14.80%	-	-	-		-		
1995				35%	-	14.80%	-	-	-		-		
1996				35%	-	14.80%	-	-	-		-		
1997				35%	-	14.80%	-	-	-		-		
1998				35%	-	14.80%	-	-	-		-		
1999				35%	-	14.80%	-	-	-		-		
2000				35%	-	14.80%	-	-	-		-		
2001				35%	-	14.80%	-	-	-		-		
2002	2,914	2,914	0.0%	35%	1,020	14.80%	151	-	151		151	237	-36%
2003	11,839	11,839	0.0%	35%	4,144	14.80%	613	151	613		764	1,201	-36%
2004	23,937	23,937	0.0%	35%	8,378	14.80%	1,240	764	1,240		2,004	3,149	-36%
2005	38,012	38,012	0.0%	35%	13,304	14.80%	1,969	2,004	1,969		3,973	6,243	-36%
2006	53,475	53,475	0.0%	35%	18,716	14.80%	2,770	3,973	2,770		6,743	10,596	-36%
2007	61,944	62,688	-1.2%	35%	21,680	14.80%	3,209	6,743	3,209		9,952	15,698	-37%
2008	69,880	72,380	-3.5%	35%	24,458	14.80%	3,620	9,952	3,620		13,572	21,589	-37%
2009	78,037	82,648	-5.6%	35%	27,313	14.80%	4,042	13,572	4,042	151	17,463	28,079	-38%
2010	81,982	88,735	-7.6%	35%	28,694	14.80%	4,247	17,463	4,247	613	21,096	34,338	-39%
2011	83,630	92,510	-9.6%	35%	29,270	14.80%	4,332	21,096	4,332	1,240	24,189	39,920	-39%

	Corrected Aggregate Savings (MWH)	BHE Assumption (MWH)	Percent Difference	BHE as Percent of State Commercial	Allocation to Industrial	Industrial Savings	BHE as Percent of State Industrial	BHE Industrial Savings per year (MWH)	Opening Cumulative Savings (MWH)	Add: Incremental Savings (MWH)	Less: Expired Savings (MWH)	Closing Cumulative Savings (MWH)
1989				14.80%	15%	-	11.60%	-				
1990				14.80%	15%	-	11.60%	-	-	-		-
1991				14.80%	15%	-	11.60%	-	-	-		-
1992				14.80%	15%	-	11.60%	-	-	-		-
1993				14.80%	15%	-	11.60%	-	-	-		-
1994				14.80%	15%	-	11.60%	-	-	-		-
1995				14.80%	15%	-	11.60%	-	-	-		-
1996				14.80%	15%	-	11.60%	-	-	-		-
1997				14.80%	15%	-	11.60%	-	-	-		-
1998				14.80%	15%	-	11.60%	-	-	-		-
1999				14.80%	15%	-	11.60%	-	-	-		-
2000				14.80%	15%	-	11.60%	-	-	-		-
2001				14.80%	15%	-	11.60%	-	-	-		-
2002	2,914	2,914	0.0%	14.80%	15%	437	11.60%	51	-	51		51
2003	11,839	11,839	0.0%	14.80%	15%	1,776	11.60%	206	51	206		257
2004	23,937	23,937	0.0%	14.80%	15%	3,591	11.60%	417	257	417		673
2005	38,012	38,012	0.0%	14.80%	15%	5,702	11.60%	661	673	661		1,335
2006	53,475	53,475	0.0%	14.80%	15%	8,021	11.60%	930	1,335	930		2,265
2007	61,944	62,688	-1.2%	14.80%	15%	9,292	11.60%	1,078	2,265	1,078		3,343
2008	69,880	72,380	-3.5%	14.80%	15%	10,482	11.60%	1,216	3,343	1,216		4,559
2009	78,037	82,648	-5.6%	14.80%	15%	11,706	11.60%	1,358	4,559	1,358	51	5,866
2010	81,982	88,735	-7.6%	14.80%	15%	12,297	11.60%	1,426	5,866	1,426	206	7,086
2011	83,630	92,510	-9.6%	14.80%	15%	12,544	11.60%	1,455	7,086	1,455	417	8,125

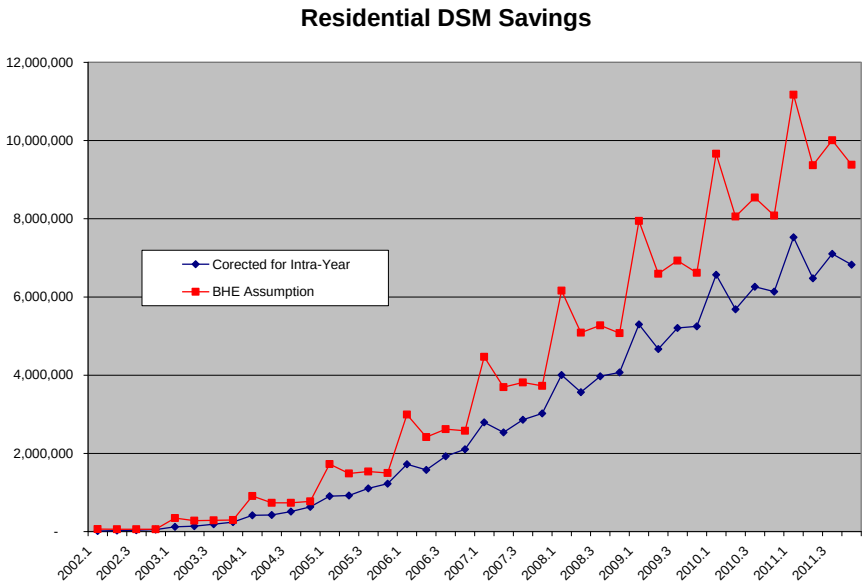
BHE's Approach to Allocating DSM Savings within a Year

We have reviewed BHE's method for allocating annual cumulative DSM within each year and found there to be problems with the method. BHE implicitly assumes that all of the annual DSM savings realized from the efficiency programs occur at the beginning of the year rather than throughout the year. This is inappropriate because the DSM programs of course do not all occur on January 1st of each year. To demonstrate problems with BHE's approach, assume that annual DSM savings are projected to be 1,200 MWH per year with 100 MWH of savings occurring in each month. In this hypothetical example, BHE's method implies that customers can obtain the accumulated savings of 1,200 MWH in January, even though the full effect of the savings is not realized until December. A correct approach recognizes that DSM gradually accumulates over the course of a year on a month by month basis. In the simple example with savings accumulating at the rate of 100 MWH per month, the average accumulated DSM energy savings over the course of the year is 600 MWH rather than BHE's assumption of 1,200 MWH.

We have corrected BHE's approach through first accumulating the DSM savings on a quarter by quarter basis and then allocating the accumulated quarterly savings on the basis of the relative quarterly to annual sales in the period. To illustrate this calculation, consider the simple example discussed above. When DSM is accumulated on a monthly basis and then the accumulated amount is allocated on the basis of monthly usage, the correct savings of 600 MWH is measured.

Month	DSM	Accum EOM	Accum BOM	Average	DSM per Month
1	100	100	0	50	4.17
2	100	200	100	150	12.50
3	100	300	200	250	20.83
4	100	400	300	350	29.17
5	100	500	400	450	37.50
6	100	600	500	550	45.83
7	100	700	600	650	54.17
8	100	800	700	750	62.50
9	100	900	800	850	70.83
10	100	1000	900	950	79.17
11	100	1100	1000	1050	87.50
12	100	1200	1100	1150	95.83
				Total	600

The effect of correcting the DSM savings within a year as well as the other adjustments to residential DSM is show on the graph below. These corrected calculations reduce DSM savings in 2008 for residential customers by 26% and reduce the DSM savings by about 40% for commercial customers.



DSM Savings from Earlier BHE Programs

In its analysis, BHE only accounts for DSM savings realized from Efficiency Maine programs and it does not consider DSM programs developed by the company before they were administered by Efficiency Maine. According to data requests provided by BHE, the DSM savings realized from programs in the 1990s were comparable or higher than those anticipated by Efficiency Maine. For example, in 1997, BHE made expenditures of $2.17 million and realized 47,505 MWH of savings. By contrast, the Efficiency Maine allocated expenditures to BHE are $1.90 million and the realized energy savings are expected to be 43,179 MWH.

If the earlier DSM programs administered by BHE are included in the analysis, there are two effects on the sales forecasts. First, the expiration of the existing programs should be incorporated in the analysis. As the DSM savings

from earlier programs expire, the observed BHE sales increase. Second, the base level of pre-DSM sales that is the dependent variable in BHE's regression models should be increased to reflect the prior programs when establishing the sales forecast.

To incorporate the effect of the earlier BHE DSM programs in the sales forecast, the data that is required includes:

- The amount of increased energy savings from DSM programs that were established in each year;
- The average life of the prior DSM programs; and
- The allocation of DSM energy savings between customer classes.

BHE provided data on the accumulated amount of DSM that was realized on a year by year basis aggregated for all customer classes. However, the Company did not provide the amount of DSM savings realized on an incremental basis each year, the average life of the programs, nor the allocation of programs to different customer classes. To derive the amount of new energy savings each year before accumulation of the savings, we assume a program life comparable to the life of Efficiency Maine programs (i.e., seven years) and then compute the amount of DSM that has expired. New DSM, then, is estimated as follows:

$$\text{Accumulated Savings}_t = \text{Accumulated Savings}_{t-1} + \text{New DSM} - \text{Expired DSM}$$

$$\text{New DSM} = \text{Accumulated Savings}_t - \text{Accumulated Savings}_{t-1} + \text{Expired DSM}$$

Our estimate of new DSM is shown in the table below:

		Average Program Life		7					
		BHE Accumulated Energy Savings	Change in DSM Savings	Prior to Expiration	Opening DSM Savings	New DSM Programs	Expired DSM Programs	Closing DSM Programs	Check
1985	1	4,092	4,092	TRUE	-	4,092	-	4,092	4,092
1986	2	7,492	3,400	TRUE	4,092	3,400	-	7,492	7,492
1987	3	10,795	3,303	TRUE	7,492	3,303	-	10,795	10,795
1988	4	14,385	3,590	TRUE	10,795	3,590	-	14,385	14,385
1989	5	18,907	4,522	TRUE	14,385	4,522	-	18,907	18,907
1990	6	21,710	2,803	TRUE	18,907	2,803	-	21,710	21,710
1991	7	24,553	2,843	TRUE	21,710	2,843	-	24,553	24,553
1992	8	29,428	4,875	FALSE	24,553	8,967	4,092	29,428	29,428
1993	9	34,604	5,176	FALSE	29,428	8,576	3,400	34,604	34,604
1994	10	38,657	4,053	FALSE	34,604	7,356	3,303	38,657	38,657
1995	11	43,825	5,168	FALSE	38,657	8,757	3,590	43,825	43,825
1996	12	48,573	4,748	FALSE	43,825	9,270	4,522	48,573	48,573
1997	13	47,505	(1,068)	FALSE	48,573	1,735	2,803	47,505	47,505
1998	14	45,600	(1,905)	FALSE	47,505	938	2,843	45,600	45,600
1999	15	42,643	(2,956)	FALSE	45,600	6,011	8,967	42,643	42,643
2000	16	40,096	(2,547)	FALSE	42,643	6,029	8,576	40,096	40,096
2001	17	37,106	(2,990)	FALSE	40,096	4,366	7,356	37,106	37,106
2002	18	33,357	(3,749)	FALSE	37,106	5,009	8,757	33,357	33,357

Once we computed the total historic DSM, we allocated the energy savings to residential, commercial and industrial customers on the same basis that Efficiency Maine savings using the 50%, 35% and 15% factors. The net effect of adjusting for these prior DSM programs is to increase the sales forecast. The specific quantification of this adjustment depends on the manner in which the addition of DSM programs affects the regression equations.

6. Price Elasticity in Residential and Commercial Forecast

In this section we describe our findings with respect to how changes in the price of electricity affect BHE's sales forecast. There are two general ways in which future electricity prices affect BHE's sales forecast. The first is through

measurement of the price elasticity variable. The second is the future prices forecast for the period.

To analyze price elasticity issues, we work through the regression equations and incorporate the manner in which BHE DSM programs affect elasticity parameters. In addition, we consider BHE's forecast of residential and commercial prices. The table below compares the price elasticity and the price forecast made by BHE with the price elasticity parameter and the price forecast that we estimated.

	Percent Change in Real Price Used in Regression from 2005 to 2008	Price Elasticity Parameter	Percent Change in Quantity Sales
Residential			
BHE	17.27%	(0.1847)	-3.19%
Staff	9.78%	(0.1361)	-1.33%
Commercial			
BHE	9.15%	(0.1880)	-1.72%
Staff	4.17%	(0.0302)	-0.13%

BHE uses an average of the previous four quarter prices in determining the price elasticity of demand for residential customers and uses the average of eight quarters to four quarters ago price in the commercial regression equation. BHE explains the price elasticity method as follows:

> "On average, the response of consumers to a price change is not instantaneous but is spread out. Thus there is some lag between price observation and consumer reaction. For example with the residential consumers we assumed that one year was adequate time to make adjustments. For the commercial sector, we hypothesized that they would need a longer time to adjust and we thus lagged the moving average price variable four periods." (Response to Examiners Data Request Number 1, Question 8.)

Price Elasticity Parameter

BHE estimates the price elasticity parameter through regression analysis of how past changes in real price move together with movements in residential and commercial sales. BHE maintains that its regression analysis is robust because of high R-squared statistics. The Company suggested in the technical conference that similar forecasts would be obtained with alternative definitions of the price variable.

The Company, in this case, chose to change its regression equations from those estimated in a prior forecast that used data from 1987 through 2004. Specifically, the Company changed how time lags in commercial prices are assumed to affect sales; changed the way it transformed variables to logarithms; changed its definition of income for the commercial regression; and made various other revisions to the regression model including making the DSM adjustments to the dependent variable. BHE also decided to use alternative time lags in deriving prices for its commercial and residential equations. As part of our analysis of BHE's forecast model, we have investigated how the alternative regression specifications affect the price elasticity estimate.

BHE's price elasticity parameter is about -.185 for the residential equation and about -.188 for the commercial equation (these elasticity parameters are estimated through transforming BHE's equations to logarithms.) By contrast, in its previous analysis, the parameters were -0.156 and -.04 respectively, suggesting that the addition of a few years of data has increased price elasticity by a wide margin. The parameters estimated by BHE are also higher than parameters estimated in other studies. For example, a Department of Energy

study references a California study that estimated residential price elasticity to be -.09.

In investigating whether BHE's price elasticity parameters are a robust as BHE suggests, we first ran a series of regression equations using alternative regression equations and alternative lag structures for the price variable. From this analysis, we find that BHE's residential elasticity parameters are biased upwards. The first regression we ran tested BHE's positions with respect to the R-squared and the robustness of the regressions. We removed all of the price, income and trend values, only leaving the quarterly dummy variables. This regression produced an R-squared of .89 suggesting that 89% of the variation in residential sales is simply explained by the seasonal dummy variables. This analysis implies that the high R-squared statistics do not come from price and income variables and the high R-squared in the regression does not necessarily imply that the elasticity parameters are unbiased and efficient.

We have run a number of alternative regression equations and evaluated the price elasticity parameter. For convenience, we have transformed the data to logarithms so that the coefficient on the price variable represents price elasticity. These regressions are summarized in the two tables below for alternative residential and commercial specifications and alternative data series. The tables show that the price elasticity parameter varies significantly using alternative specifications suggesting that the parameter is not as robust as BHE suggests.

Alternative Residential Regressions	
	Price Elasticity Estimate
BHE Replication	
BHE Replication - Log Transformation	(0.185)
Total Sales instead of Sales per Customer	(0.156)
Historic Sales without DSM Adjustment	(0.147)
Corrected DSM - Log of Sales per Customer	(0.137)
Corrected DSM and Other Variables	**(0.136)**
Corrected DSM and Other Variables - No Trend	(0.118)
Corrected DSM and Other Variables - No Interaction Trends	(0.094)

Commercial Regressions	
	Price Elasticity
BHE Specification	
BHE Specification with Logs	(0.1880)
BHE Specification with Logs w/o Lagged Dependent Variable	(0.2455)
BHE Specification with Logs and Four Period Average Price	0.0668
BHE Specification with Logs and Real Gross Income	(0.0178)
BHE Specification with Logs and Real Gross Income/ Eight Period Price	0.0558
Corrected DSM/Eight Period Price/Real Gross Income	0.0221
Corrected DSM/Gross Income/Lagged and Delayed	(0.0169)
Corrected DSM/Disposable Income/Eight Period Price	**(0.0302)**
Corrected DSM/Disposable Income/Eight Period Price/Lagged Dependent	(0.0342)
Corrected DSM/Disposable Income/Eight Period Price/No Trend	0.1035

The commercial regressions demonstrate prices must be defined in a questionable manner in order to obtain a negative sign on the elasticity parameter. In order to come up with its price elasticity parameter, BHE had to assume that commercial customers do not respond at all to price changes within a year, but they somehow remember price changes from five to eight quarters ago and respond to those changes. This contrasts with residential customers who are assumed to only respond to prices for the recent four quarters. In its earlier forecast, BHE assumed that commercial customers responded to the average price from an average of prices over the past three years. To develop our commercial forecast, we have used a simpler price variable that averages prices over the past two years.

Price of Electricity Forecast

The residential and commercial sales prices depend on the price forecast as well as the price elasticity parameter. BHE uses a price forecast that projects both residential prices and commercial prices to increase by a large margin in the next few years. The projected price increases are driven by increases in generation rates, transmission rates and distribution rates. We have evaluated the components of BHE's price forecast and made the following adjustments:

- The generation price component is adjusted to reflect the results of the most recent standard offer bid processes and more current forward prices published by NYMEX.
- BHE assumed transmission prices increase of 80% from 2005 through 2008 and the Company provided no specific quantitative support for the increases. While it is plausible that the regional component of transmission rates will increase, there are offsetting factors including the shift of certain costs from BHE local transmission rates to regional rates when the NRI enters rate base. Given the lack of support for transmission price increases and statements made by BHE in other cases, we have held transmission rates flat after the assumed 2006 increase.
- In projecting distribution prices, BHE assumed that the full amount of its request in this case would be granted in 2008. Since price elasticity affects sales and sales affects rates, the rate assumption

creates circularity in the calculations. Based on our analysis of this point, it appears that BHE's requested increase is too high, and that BHE's distribution rates may actually not increase. In light of this, and to avoid circularity, we have simply held the distribution rates flat in 2008.

The 2008 real prices that result from these adjustments compared to the BHE projections are shown on the tables below for the residential and the commercial segments.

	Residential Real Rate Comparison						
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
BHE Inflation Rate		-0.257%	1.691%	1.663%	1.635%	1.609%	1.584%
BHE Inflation Index	**1.00**	1.00	1.01	1.03	1.05	1.06	1.08
BHE Real Rate							
SC	2.01	2.01	1.98	1.61	1.51	1.49	1.21
SO	7.14	8.47	8.95	10.27	10.25	9.95	9.66
D	5.42	5.38	5.19	5.56	5.47	5.39	5.30
T	1.04	1.05	1.21	1.52	1.78	1.75	1.73
Blended	15.60	16.92	17.32	18.96	19.02	18.58	17.90
Percent Increase - 2005 to 2008				21.5%			
Alternative Real Rates		1.90%	2.40%	2.30%	2.20%	2.20%	2.20%
Corrected Inflation Index	1	1.02	1.04	1.07	1.09	1.11	1.14
Adjusted Real Rates							
SC	2.01	1.97	1.92	1.55	1.45	1.42	1.15
SO	7.14	8.29	8.59	9.14	8.81	8.43	8.08
D	5.42	5.32	5.14	4.98	4.87	4.76	4.66
T	1.04	1.03	1.13	1.10	1.08	1.05	1.03
Blended	15.60	16.61	16.78	**16.77**	16.21	15.67	14.92
Percent Increase - 2005 to 2008				7.5%			
Staff vs BHE				**-11.6%**			

	Commercial Real Rate Forecast						
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
BHE Inflation Rate		-0.257%	1.691%	1.663%	1.635%	1.609%	1.584%
BHE Inflation Index	**1.00**	1.00	1.01	1.03	1.05	1.06	1.08
BHE Real Rate							
SC	0.019	0.019	0.018	0.015	0.014	0.014	0.011
SO	0.075	0.092	0.097	0.112	0.112	0.108	0.105
D	0.032	0.032	0.031	0.033	0.032	0.032	0.031
T	0.009	0.009	0.010	0.013	0.014	0.014	0.015
Blended	0.135	0.151	0.157	0.172	0.172	0.168	0.162
Percent Increase - 2005 to 2008				27.8%			
Alternative Real Rates		1.90%	2.40%	2.30%	2.20%	2.20%	2.20%
Corrected Inflation Index	1	1.02	1.04	1.07	1.09	1.11	1.14
Adjusted Real Rates							
SC	0.019	0.018	0.018	0.014	0.014	0.013	0.011
SO	0.075	0.094	0.088	0.089	0.088	0.084	0.081
D	0.032	0.031	0.030	0.029	0.029	0.028	0.027
T	0.009	0.009	0.010	0.009	0.009	0.009	0.009
Blended	0.135	0.153	0.146	0.142	0.140	0.135	0.128
Percent Increase - 2005 to 2008				5.0%			
Staff vs BHE				-17.8%			

7. Residential Sales Forecast

The residential sales projection is affected by the forecast input variables for price, income, time trends, DSM and the number of customers as well as the parameters estimated in the regression analysis. This section summarizes elements of the residential forecast other than the DSM adjustments and the price elasticity analysis discussed above. We first present the regression equation for the residential use per customer. Then we discuss forecasts of the number of new customers. Finally, we show components of the net residential sales forecast that adjusts for both DSM and the number of customers.

Residential Regression Equation

We have used an OLS regression equation to compute the various parameters that are the basis for the residential sales forecast. The data used to create the regression equation includes the adjustments to DSM described

above. In developing the regression, we have transformed the data to logarithms and we have accepted BHE's approach of using real disposable income per household in the Bangor area to represent income. (The reason we transformed the data to logarithms is explained in Appendix B.) The regression equation is shown in the table below. The regression includes the adjusted DSM data and results in a price elasticity parameter of -.136.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.981262305
R Square	0.96287571
Adjusted R Square	0.956688329
Standard Error	0.022446644
Observations	71

ANOVA

	df	*SS*	*MS*
Regression	10	0.784090469	0.078409047
Residual	60	0.03023111	0.000503852
Total	70	0.814321579	

	Coefficients	*Standard Error*	*t Stat*
Intercept	5.597560294	0.427929064	13.08057985
HDD15	5.25935E-05	1.58628E-05	3.315520133
CDD15	-3.47335E-05	6.76438E-05	-0.513477109
DQ1	0.116800131	0.019712952	5.925045295
DQ2	-0.029979904	0.03537556	-0.84747503
DQ3	-0.157769468	0.047259615	-3.338357065
Log of Real Price - Staff	-0.136139448	0.062239783	-2.187338103
Log of Real Income per Household - Staff	0.025689358	0.039557365	0.649420348
Trend with of Log Transformation	-0.015067264	0.007264752	-2.074023197
Q2 Trend Interaction Trend with of Log Transformation	0.016830753	0.007104027	2.369184978
Q3 Trend Interaction Trend with of Log Transformation	0.063961911	0.007610177	8.40478662

Input Variables and Residential Forecast

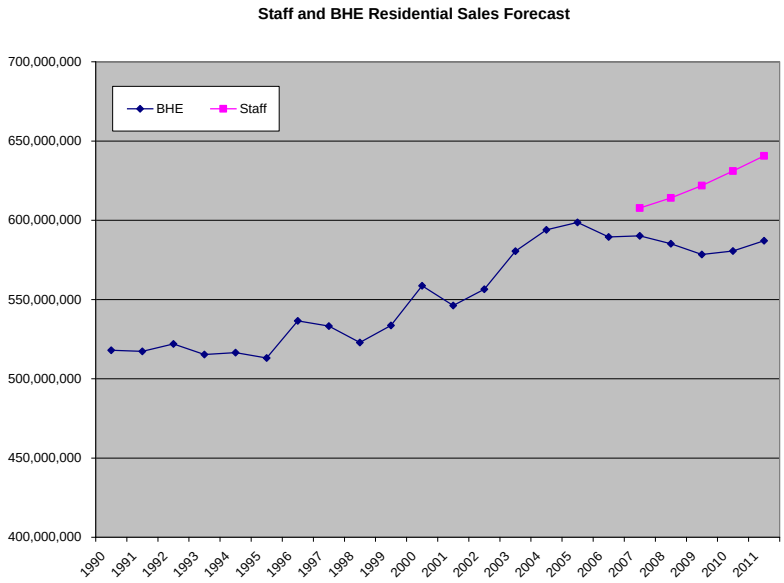
In using the regression to create a forecast, independent variables must be projected and the number of customers and DSM savings are incorporated in the analysis. To project the number of new customers, we have used growth rates for the past five years rather than for the entire period. We have excluded the high growth in 2004 resulting in a projection of 1.4% as shown on the table below.

	Percent Increase in Customers
2002	1.59%
2003	1.71%
2004	2.01%
2005	1.13%
2006	1.17%
Average w/o 2004	1.40%
Average w/ 2004	1.53%

Residential Forecast Components

To derive the final residential forecast, the regression parameters are multiplied by the forecast variables to project the logarithm of sales per customer. The forecast of the sales per customer is then transformed back to non-logarithmic form and the sales per customer values are multiplied by the number of customers. This establishes the sales forecast without DSM. Finally, the accumulated DSM is subtracted in order to derive the final forecast as shown on the following table. The graph shown below the table compares the BHE residential forecast with our forecast.

		Forecast Per Customer Before DSM in Logs	Non-Log Transformed Forecast per Customer	Adjusted Number of Customers	Multiplied by Number of Customers	Forecast Sales Before DSM Adjstment	Less: DSM Adjustment	Final Residential Sales Forecast	Annual Sales Forecast
2006.3	**2006**	6.20	493.27	301,279	148,612,049	148,612,049	4,005,336	144,606,714	598,979,079
2006.4	**2006**	6.22	501.33	297,795	149,293,680	149,293,680	3,973,184	145,320,496	598,979,079
2007.1	**2007**	6.39	596.40	298,005	177,730,791	177,730,791	4,719,039	173,011,752	607,726,368
2007.2	**2007**	6.17	477.61	302,607	144,528,284	144,528,284	3,971,750	140,556,534	607,726,368
2007.3	**2007**	6.21	496.80	305,509	151,778,314	151,778,314	4,166,606	147,611,708	607,726,368
2007.4	**2007**	6.21	498.98	301,976	150,680,485	150,680,485	4,134,111	146,546,374	607,726,368
2008.1	**2008**	6.39	594.54	302,189	179,662,306	179,662,306	5,110,608	174,551,698	614,055,169
2008.2	**2008**	6.17	476.91	306,856	146,341,519	146,341,519	4,373,402	141,968,117	614,055,169
2008.3	**2008**	6.21	497.71	309,798	154,190,867	154,190,867	4,681,880	149,508,987	614,055,169
2008.4	**2008**	6.21	498.57	306,215	152,669,456	152,669,456	4,643,089	148,026,366	614,055,169
2009.1	**2009**	6.39	594.33	306,431	182,121,128	182,121,128	5,776,377	176,344,752	621,868,576
2009.2	**2009**	6.17	477.68	311,164	148,637,566	148,637,566	4,946,720	143,690,846	621,868,576
2009.3	**2009**	6.22	500.24	314,148	157,150,502	157,150,502	5,347,574	151,802,929	621,868,576
2009.4	**2009**	6.21	500.08	310,515	155,282,275	155,282,275	5,252,225	150,030,050	621,868,576
2010.1	**2010**	6.39	596.81	310,733	185,448,550	185,448,550	6,509,246	178,939,304	631,006,031
2010.2	**2010**	6.17	480.05	315,532	151,471,635	151,471,635	5,663,281	145,808,355	631,006,031
2010.3	**2010**	6.22	503.83	318,558	160,500,211	160,500,211	6,235,804	154,264,407	631,006,031
2010.4	**2010**	6.22	502.16	314,874	158,117,448	158,117,448	6,123,482	151,993,967	631,006,031
2011.1	**2011**	6.40	599.32	315,096	188,842,432	188,842,432	7,527,922	181,314,510	640,621,006
2011.2	**2011**	6.18	482.69	319,962	154,442,801	154,442,801	6,498,030	147,944,771	640,621,006
2011.3	**2011**	6.23	507.93	323,031	164,078,068	164,078,068	7,124,555	156,953,513	640,621,006
2011.4	**2011**	6.22	505.06	319,295	161,262,225	161,262,225	6,854,013	154,408,212	640,621,006



8. Commercial Sales Forecast

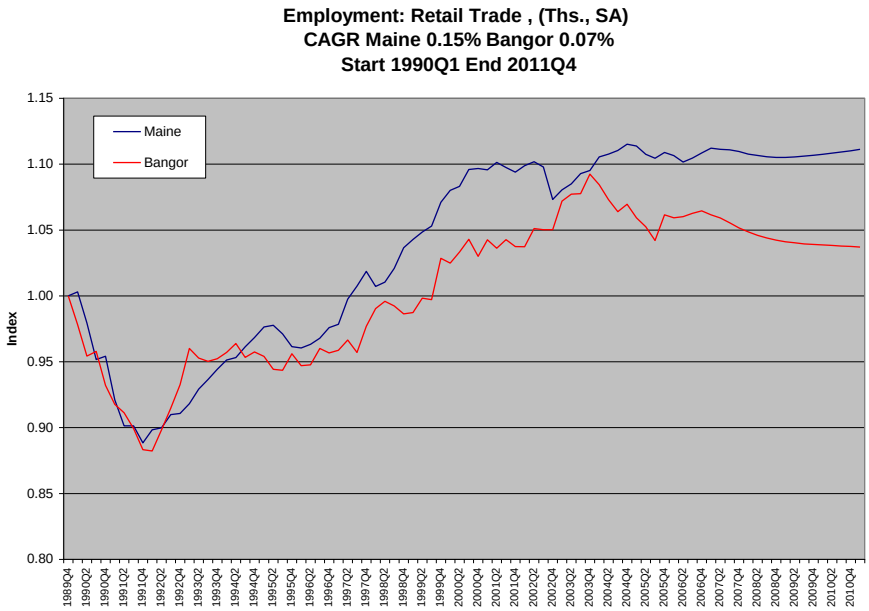
The commercial sales projection for BHE is affected by the forecast input variables for income, time trends, and DSM as well as the parameters estimated in the regression analysis. In addition to the adjustments described above involving DSM and price elasticity, our commercial forecast differs from BHE's because we used a different variable to represent income. This section first describes why we selected an alternative income variable. Next, we present the commercial regression and then we present the final commercial forecast.

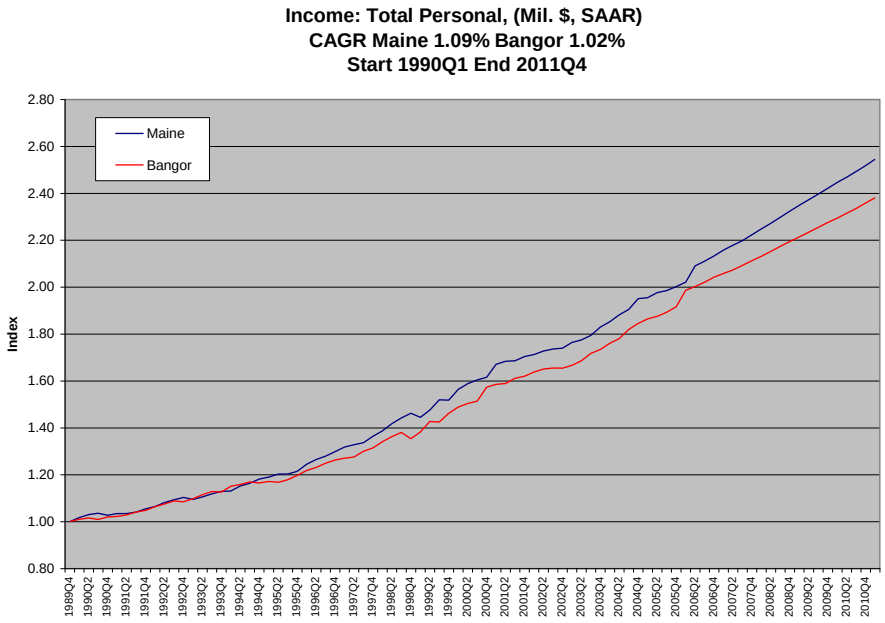
Alternative Income Variable

To establish the commercial equation, BHE used Maine retail employment to account for how its commercial sales are affected by overall economic activity. This variable selection raises questions as to why the Company did not use aggregate income and why BHE used statewide data rather than information for the Bangor region. In the prior forecast, BHE used gross state product in its

regression equation. In its residential equation, BHE uses disposable income for the Bangor area rather than for the entire State of Maine. When modeling the effect of income on sales, it is more appropriate to use a measure for the Bangor area and it better to use a measure of aggregate income than retail employment which only includes one sector since real disposable income for the Bangor area is more closely correlated with sales and is more theoretically valid because commercial sales are driven by overall economic activity rather than employment in one sector.

BHE's choice of retail trade rather than use of an aggregate income variable as it did in the prior forecast produces a lower sales forecast. The graphs below illustrate this by comparing historic and projected data for retail employment and for disposable income. Whereas retail employment is projected to flatten out, the gross product is forecast to continue growing at historic rates.





Commercial Regression

As with the residential equation, we have used an OLS regression equation to compute the various parameters that underlie the commercial sales forecast. The data for the regression includes the adjustments to DSM, the eight quarter real price variable discussed in the residential price elasticity section and the Bangor area income variable discussed above. As with the residential equation, in making the forecast, we have transformed the data to logarithms. (The lagged commercial sales is not used as a variable in the equation because it creates statistical problems and it is not significant.) The commercial regression equation we used in making the forecast is shown in the table below.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.973224917
R Square	0.947166739
Adjusted R Square	0.937732228
Standard Error	0.024343887
Observations	67

ANOVA

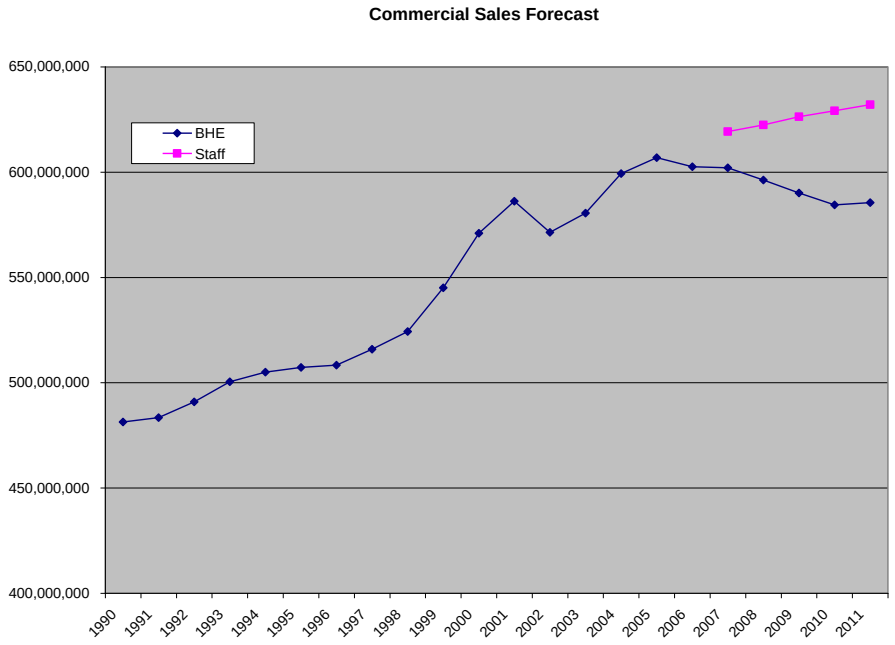
	df	*SS*	*MS*
Regression	10	0.594958821	0.059495882
Residual	56	0.033186992	0.000592625
Total	66	0.628145813	

	Coefficients	*Standard Error*	*t Stat*
Intercept	14.63406735	0.38486265	38.02412981
HDD15	6.4059E-05	1.87874E-05	3.409685403
CDD15	-2.6653E-06	7.60813E-05	-0.035032244
DQ1	-0.01285278	0.023763336	-0.540866006
DQ2	-0.101407983	0.046276185	-2.191364398
DQ3	0.047348136	0.058376999	0.811075197
LN Real Commercial Price Averaged 8	-0.030243239	0.083188665	-0.363549996
LN Bangor Disposable Income Real	0.473857438	0.056109209	8.445270326
L TREND	0.005332413	0.014906759	0.357717774
L TDQ2	0.046775089	0.010676784	4.381009185
L TDQ3	0.053929959	0.011235487	4.799966446

Commercial Forecast Components

To compute the net commercial forecast, the forecast of the logarithm of sales is transformed back to non-logarithmic form. The accumulated DSM is then subtracted from the forecast in order to derive the final forecast. The commercial sales forecast is shown in the table below and compared to the BHE forecast on the graph below.

		Log of Commercial Sales Before DSM from Regression Forecast	Sales Before DSM in kWh	Less: Accumulated DSM	Sales Less Accumulated DSM	Annual Sales
2006.4	**2006**	18.825	149,757,741	2,931,892	146,825,849	
2007.1	**2007**	18.888	159,625,672	3,109,467	156,516,206	619,256,795
2007.2	**2007**	18.831	150,792,043	3,015,751	147,776,291	619,256,795
2007.3	**2007**	18.958	171,056,162	3,443,239	167,612,923	619,256,795
2007.4	**2007**	18.829	150,466,598	3,115,224	147,351,374	619,256,795
2008.1	**2008**	18.893	160,338,239	3,397,616	156,940,623	622,409,662
2008.2	**2008**	18.839	151,969,233	3,389,796	148,579,437	622,409,662
2008.3	**2008**	18.967	172,745,744	3,913,377	168,832,367	622,409,662
2008.4	**2008**	18.837	151,635,326	3,578,091	148,057,235	622,409,662
2009.1	**2009**	18.901	161,643,247	3,922,187	157,721,060	626,310,200
2009.2	**2009**	18.850	153,589,934	3,913,716	149,676,218	626,310,200
2009.3	**2009**	18.978	174,634,785	4,494,127	170,140,658	626,310,200
2009.4	**2009**	18.845	152,836,117	4,063,852	148,772,265	626,310,200
2010.1	**2010**	18.909	162,920,557	4,475,027	158,445,530	629,108,795
2010.2	**2010**	18.860	155,109,173	4,568,161	150,541,012	629,108,795
2010.3	**2010**	18.988	176,388,496	5,346,562	171,041,934	629,108,795
2010.4	**2010**	18.852	153,970,294	4,889,975	149,080,319	629,108,795
2011.1	**2011**	18.916	164,173,951	5,339,677	158,834,274	632,015,438
2011.2	**2011**	18.870	156,740,238	5,406,757	151,333,480	632,015,438
2011.3	**2011**	18.999	178,355,604	6,256,804	172,098,800	632,015,438
2011.4	**2011**	18.861	155,388,107	5,639,224	149,748,883	632,015,438



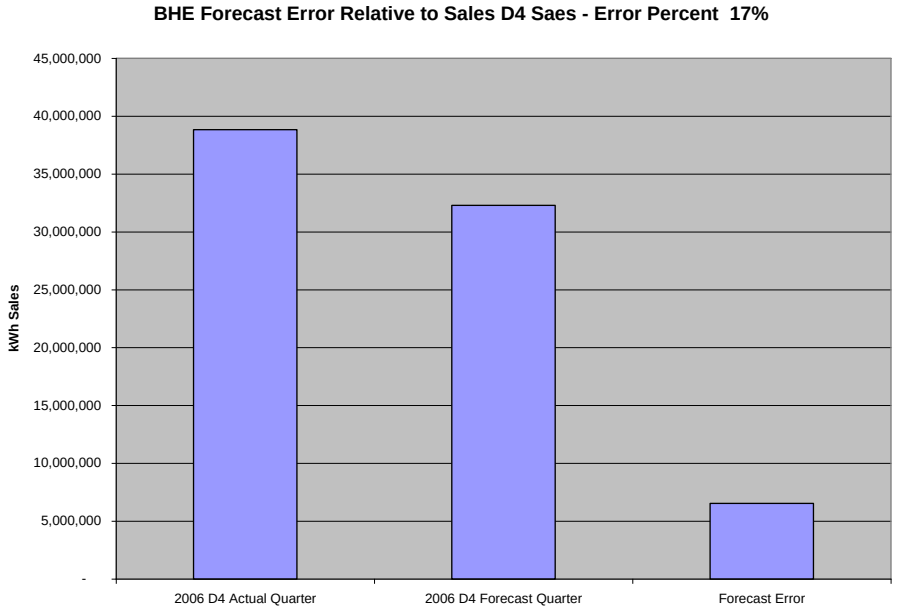
9. Industrial Sales Forecast

BHE projects its industrial sales on a different basis than other elements of the forecast. Unlike the residential and commercial sales forecasts that are

derived from a regression analysis where data can be evaluated on an objective basis, the foundation of the industrial forecast is opinions from sales executives at BHE on how the volumes sold to each separate customer will change in the future. In its industrial forecast, BHE does not add sales from unspecified customers that already have plans to add load. BHE's approach of using these opinions from sales executives makes the industrial forecast virtually impossible to verify.

Verification Problems

Verification problems with BHE's industrial sales are demonstrated by the forecast error that has already occurred in the fourth quarter of 2006. The forecast presented in BHE's direct testimony was presumably made sometime in the second half of 2006 and actual sales data for the first three quarters of 2006 was available to the Company when the forecast was created. Despite the availability of three quarters of a year of data, BHE's forecast was much lower than actual sales as shown on the graph below. In this graph we compare the forecast error for the initial projection with 2006 industrial sales for one quarter. The graph shows that the forecast error was 17% of the total sales for a quarter. Given this forecast error of 17% after just one quarter of data, it is difficult to rely on the accuracy of BHE's multi-year forecast.



Other problems with BHE's forecast include inconsistencies with historic data, changes in the paper forecast and revisions to the forecast between the initially filed testimony and the data request responses after the technical conference in March. The table below shows data for the historic years of 2004 and 2005 in the initial data request response and after BHE's update in response to an oral data request in the technical conference. Even though the data is for historic years, all of the customers have different energy use in the two responses.

Percent Difference Between Original Data Request and ODR Data Request in Customer by Customer Sales		
Customer ID	**2004 kWh Pct Difference**	**2005 kWh Pct Difference**
a2	-0.11%	-6.37%
a5	0.23%	-1.09%
a6	-4.63%	7.33%
a8	0.47%	-1.99%
a9	988.16%	-58.98%
a10	-0.39%	-1.79%
a11	0.10%	0.36%
a12	2.37%	-0.35%
a13	7.18%	0.54%
a14	3.73%	0.96%
a15	1.87%	1.07%
a18	2.46%	1.14%
a21	0.29%	-2.64%
a22	-5.90%	-2.39%
a23	-0.58%	0.70%
a25	3.48%	2.00%
a26	0.21%	-0.04%
a27	-2.45%	9.46%

The next table illustrates inconsistencies in BHE's paper forecast. While sales to paper companies do not affect BHE's distribution level, the vagaries in the paper forecast illustrate verification problems with the company's approach to forecasting industrial sales. The forecast provided in the original testimony contained an assumption that paper sales are reduced by 30%. However, at one place in the analysis, the 30% was assumed to occur in 2008 and in another place, the 30% reduction was assumed to occur in 2007. In the updated analysis, the paper sales are much higher, but they fall off to zero.

	Original Forecast		
	Paper Forecast Spreadsheet	Distribution Sales Forecast	Updated Forecast
Oct-06	7,677,009	7,677,009	12,713,043
Nov-06	7,677,009	7,677,009	11,328,688
Dec-06	7,677,009	7,677,009	10,998,647
Jan-07	7,677,009	7,677,009	10,998,647
Feb-07	7,677,009	7,677,009	10,998,647
Mar-07	7,677,009	7,677,009	10,998,647
Apr-07	7,677,009	7,677,009	10,998,647
May-07	7,677,009	7,677,009	10,998,647
Jun-07	7,677,009	7,677,009	10,998,647
Jul-07	7,677,009	7,677,009	10,998,647
Aug-07	7,677,009	7,677,009	10,998,647
Sep-07	7,677,009	7,677,009	-
Oct-07	7,677,009	5,373,906	-
Nov-07	7,677,009	5,373,906	-
Dec-07	7,677,009	5,373,906	-
Jan-08	7,677,009	5,373,906	-
Feb-08	7,677,009	5,373,906	-
Mar-08	7,677,009	5,373,906	-
Apr-08	7,677,009	5,373,906	-
May-08	7,677,009	5,373,906	-
Jun-08	7,677,009	5,373,906	-
Jul-08	7,677,009	5,373,906	-
Aug-08	7,677,009	5,373,906	-
Sep-08	7,677,009	5,373,906	-
Oct-08	5,373,906	5,373,906	-
Nov-08	5,373,906	5,373,906	-
Dec-08	5,373,906	5,373,906	-
Jan-09	5,373,906	5,373,906	-
Feb-09	5,373,906	5,373,906	-
Mar-09	5,373,906	5,373,906	-

Industrial Forecast

In developing an alternative forecast, we have separated the BHE customers into various categories and then made simple, objective assessments of how the sales could move in the future. These categories and the rationale for the forecast are summarized below:

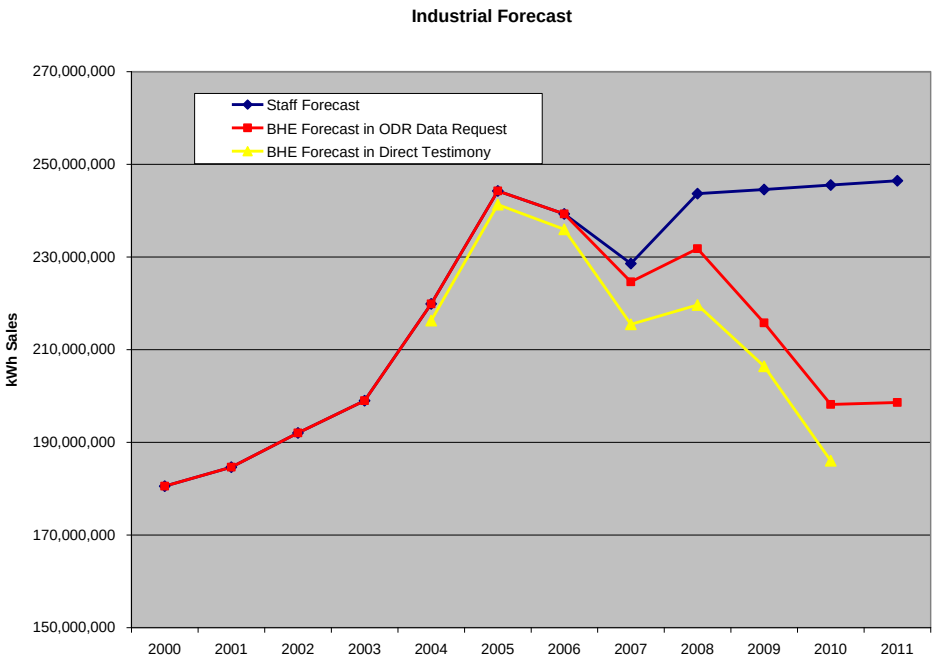
- ***Unspecified new customers:*** We did not assume any unspecified new customers even though this creates a downward bias in the forecast and even though a customer was added between the original filing and the response to oral data requests filed after the workshop.
- ***[Name to be redacted][Eastern Maine Medical Center], Customer A18***: We have adopted BHE's assumption for this customer because it has installed a generation plant.

- ***[Name to be redacted][University of Maine], Customer A24 and A25***: This customer has signed a special contract and was shown in both the D4 and the Competitive D4 category. Sales for this customer are assumed to grow at a rate of 2% which is below the historic compound growth rates realized before 2006.
- ***Customers taking service under rate T1:*** The sales forecast for these customers have a minor effect on distribution rates because of the change in BHE's rate design and the current low distribution rates for these customers. With the exception of [Indeck], customer A7 and A38, we have simply held sales flat at the 2006 level. For [Indeck], we have adopted BHE's forecast.
- ***Continuing Customers Since 2000:*** 26% of the non-paper industrial sales are for non-T1 customers who have been continually taking service since 2000. These customers experienced compound growth rates of above 3% before 2006. We forecast sales for these customers by simply averaging the actual historic sales realized from 2003 to 2006.
- ***New Customers and Exiting D4 Customers:*** We have grouped D4 customers that have not been continual customers since 2000. Some are new customers and some are customers who have already left. For the customers that are remaining on the system, we have simply held 2006 sales flat. BHE identified two new customers in its updated analysis. We have accepted BHE's

assumptions for these customers and assumed that [Penn Gaming], customer A43, takes service at the beginning of 2008 rather than in the middle of the year per BHE' responses to questions in the workshop.

- ***Other Competitive D4 Customers:*** Four other Competitive D4 customers make up the industrial sales. These customers are simply assumed to continue to use energy at the 2006 level.

The result of the above assumptions in forecasting industrial sales is shown on the graph below. In the graph we compare our industrial sales forecast to the forecast presented in BHE's initial testimony and in its updated analysis.



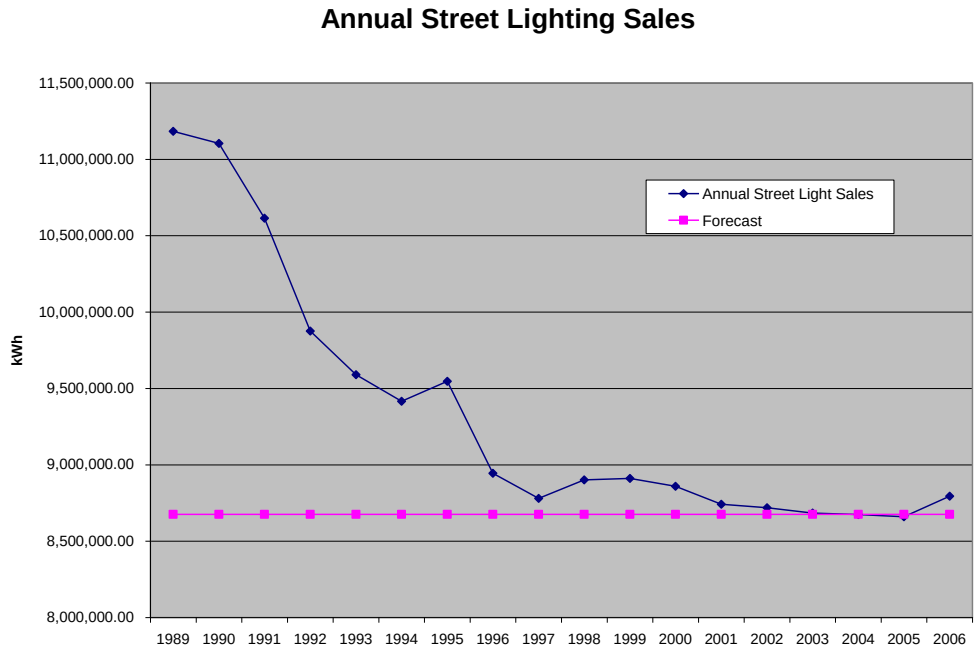
The components of the industrial sales forecast are important in establishing rates because of the differences in distribution rates for various customers in the D4 and Competitive D4 classes. In making the final industrial forecast, DSM is subtracted because of our allocation of some of the DSM programs to industrial customers. The various components of the industrial sales forecast are shown in the table below.

	2006	2007	2008	2009	2010	2011
Total T1	86,701,399	87,591,099	87,591,099	87,591,099	87,591,099	87,591,099
Total Customers with Changes	25,484,400	12,077,400	26,267,400	26,267,400	26,267,400	26,267,400
Total Continuing	63,486,300	64,400,370	64,400,370	64,400,370	64,400,370	64,400,370
Total University of Maine	44,148,800	45,031,776	45,932,412	46,851,060	47,788,081	48,743,843
Total Other Competitive D4	19,450,683	19,450,683	19,450,683	19,450,683	19,450,683	19,450,683
Total Industrial D4 and Competitive D4	239,271,582	228,551,328	243,641,964	244,560,612	245,497,633	246,453,395
Accumulated Industrial DSM	3,050,390	3,166,080	3,540,096	3,910,639	4,724,295	5,416,730
Change in DSM Since 2005	19,259	134,949	508,965	879,508	1,693,165	2,385,599
Industrial Less Accumulated DSM Since 2005	236,221,192	225,385,248	240,101,868	240,649,972	240,773,337	241,036,665
BHE Forecast	239,271,582	224,635,261	231,782,689	215,774,422	198,156,984	198,598,745
T1 Percentage	36.2%	38.3%	36.0%	35.8%	35.7%	35.5%

Finally, as noted previously, BHE's revenue projection in this case does not reflect its recently-approved rate design changes, the most notable of which in this context will shift most T1 revenue to other rate classes effective July 2007. BHE should provide an updated revenue forecast using its new rate design.

10. Lighting Forecast

BHE projects street lighting sales to remain flat. As shown in the graph below, this is a reasonable assumption given historic trends over the past decade. However, the basis for the flat forecast should be 2006 sales rather than 2005 sales. This increases the street lighting sales forecast by about 1.4%.



11. Summary

The staff forecasts of residential sales and commercial sales are above BHE's forecasts, but they are below historic sales and below the EIA forecasts. These projections correct various components of the DSM calculations and reflect more reasonable price elasticity parameters and price forecasts. The commercial sales forecast also incorporates a more appropriate income variable. The staff industrial forecast is made through using a more objective approach than the method used by BHE which relied on judgment of sales executives. The staff forecast of industrial sales used 2006 actual and simply averaged data for various customer groups.

Appendix A – Inflation Index

In computing the projected inflation index, BHE regressed the historic GDP index on a scalar ordered variable. This process results in a decline in index for the first forecast year and then a rate of inflation below 2% for projected years. Application of BHE's approach results in the deflator declining in 2006, quarter 1, the first year of the forecast. This implies that there was 1.5% price deflation for that single quarter as the index value of 1.118 in 2005.4 versus 1.115 for 2006.1. The reason for this decline was the approach of using a trend variable in a regression equation as described Appendix C. Inappropriate use of the trend variable also understates the projected inflation rate because of compounding.

The problem with BHE's approach is twofold. First, the methodology results in a low inflation rate as described above. Second, the inflation rate is not consistent with inflation assumptions elsewhere in the case. Other inflation rate assumptions in the case include the inflation rate related to distribution rates and the inflation rate implicit in the cost of capital. We have created an alternative inflation index by downloading the index and then increasing the rate at the assumed inflation rate for distribution rates which ranges between 2.4% and 2.2% per year. A comparison of the inflation rates for 2005 onward is shown in the table below.

	BHE	Staff
1990	4.06%	3.69%
1991	3.10%	3.37%
1992	2.14%	1.61%
1993	2.31%	2.17%
1994	2.15%	2.05%
1995	1.96%	1.52%
1996	1.85%	1.35%
1997	1.48%	1.73%
1998	1.14%	0.69%
1999	1.55%	1.16%
2000	2.27%	1.94%
2001	2.51%	1.87%
2002	1.66%	1.11%
2003	1.98%	1.19%
2004	2.89%	3.18%
2005	3.10%	3.15%
2006	-0.26%	1.90%
2007	1.69%	2.40%
2008	1.66%	2.30%
2009	1.64%	2.20%
2010	1.61%	2.20%
2011	1.58%	2.20%

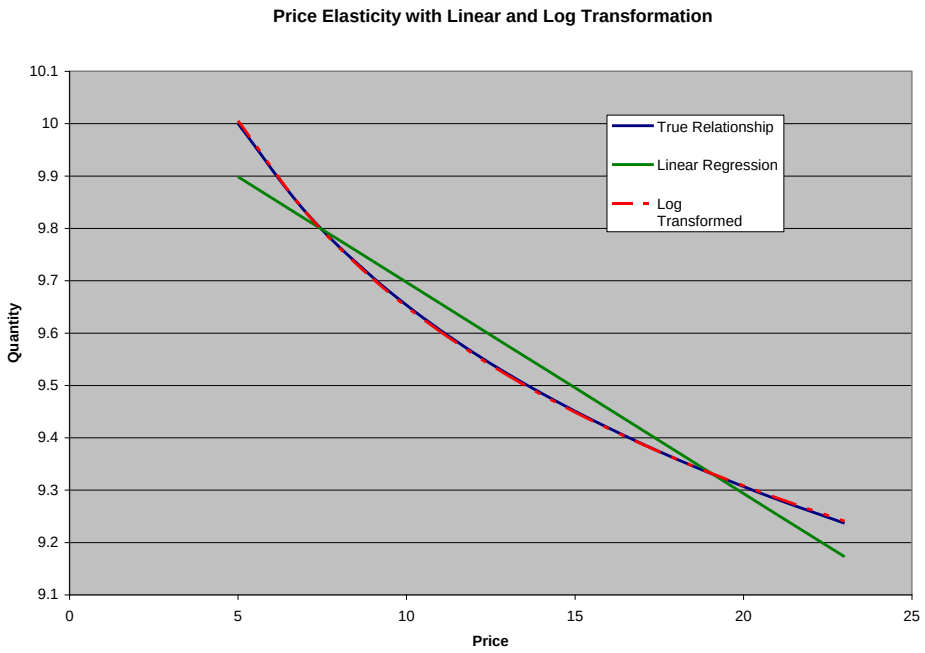
Appendix B – Transformation to Logarithms

BHE used regression equations as a basis for forecasting residential and commercial sales. In evaluating the regression equations, we have investigated whether the equations should be transformed to logarithms and whether it is reasonable to use ordered scalar variables for time trends and the interaction between time trends and seasonal indicator variables. By way of contrast, in its demand equations, CMP uses a logarithmic form and does not include trend variables that count the number of time periods.

BHE did not transform its regression to natural logarithms, meaning that in the regression equation for sales, the prices and income were not converted to logarithms before running the regression. It is common when estimating demand equations to transform equations to logarithms because of the notion that the price and income elasticity do not change every time income or price changes. Transforming the data yields estimates of price elasticity that are constant across different prices and it makes the equation less sensitive to extreme observations. To illustrate why it is appropriate to transform data to logs if the true underlying economic equation has constant price elasticity, we have constructed a simple simulation model. This model computes quantity for different prices using the following basic formulas which relate demand to price:

Price Elasticity of Demand = (Δ Quantity/Quantity)/(Δ Price/Price)

Once we computed quantities for different prices using this equation, we created two regression equations with and without transforming the data to logarithms. The graph below illustrates that the transformed equation is a more accurate reflection of the true equation that incorporates price elasticity while the linear equation can over-state or under-state demand.



Appendix C – Ordered Trend Variables in Regressions

BHE uses six different trend variables and interaction of trend and seasonal variables in its regression equations. These ordered variables do not have any economic meaning and they are not typically used in regression analyses. Further, there is nothing to suggest that the true economic factors that the variables may or may not represent follow a pattern that begins with 1 and increases by 1 for each quarter. Finally, the use of a time trend variable can create a downward bias in forecasts because the percent change from the early periods – say 1 to 2 – is far more than the percent change in later periods – say 100 to 101. We have created a simple example to illustrate this point. In this example, the true level of sales is assumed to grow at a constant rate both in the historic years used to develop the regression equation and over the forecast period. A regression equation for the level of sales is developed with an ordered time trend variable and this equation is then used to forecast sales. The graph below shows that use of the time trend causes the forecast to be much less than the true underlying growth process. In fact, the forecast is below the final historic year.

Illustration of Problem with Ordered Scalar Variables to Represent Time Trend